REMARKS

I. Introduction

By the present Amendment, claim 10 has been amended. No claims have been added or cancelled. Accordingly, claims 1-15 remain pending in the application. Claim 1 is independent.

II. Office Action Summary

In the Office Action of February 2, 2007, claim 10 was objected to because of an informality. Claims 1-3, 6-9, and 12-15 were rejected under 35 USC §102(b) as being anticipated by U.S. Patent Application Publication No. 2004/0008817 issued to Nagai. Claims 1-3, 6-9, and 12-15 were also rejected under 35 USC §102(b) as being anticipated by U.S. Patent Application Publication No. 2004/0174953 issued to Ikeda et al. ("Ikeda"). Claims 5 and 11 were rejected under 35 USC §103(a) as being unpatentable over Nagai in view of U.S. Patent Application Publication No. 2002/0057761 issued to Danielsson. Claims 4 and 10 were rejected under 35 USC §103(a) as being unpatentable over Nagai in view of U.S. Patent No. 5,602,895 issued to Fivez. These rejections are respectfully traversed.

III. Claim Objections

Claim 10 was objected to because of an informality. Regarding this objection, the Office Action indicates that claim 10 recites the phrase "the scattered x-ray elimination processing unit" which lacks proper antecedent basis in the claim.

By the present Amendment, Applicants have revised claim 10 to provide proper antecedent basis for the phrase identified in the Office Action. Withdrawal of this objection is therefore respectfully requested.

IV. Rejections under 35 USC §102

Claims 1-3, 6-9, and 12-15 were rejected under 35 USC §102(b) as being anticipated by Nagai. These claims were also alternatively rejected as being anticipated by Ikeda. In rejecting the claims, the Office Action indicates that Nagai discloses an x-ray diagnostic imaging system that comprises all of the features recited in, example, independent claim 1. In particular, the Office Action indicates that Nagai discloses an x-ray irradiation unit, an x-ray diaphragm unit, and an x-ray diaphragm setting unit for variably setting the x-ray shielded portion to be shielded by the x-ray diaphragm unit. The Office Action similarly alleges that Ikeda discloses these particular features. Applicants respectfully disagree.

Independent claim 1 defines an x-ray diagnostic imaging system that comprises:

> an x-ray irradiation unit for irradiating an object to be examined with x-rays;
>
> an x-ray diaphragm unit disposed in a direction of x-ray irradiation of the x-ray irradiation unit and shielding the irradiated x-rays except for the x-rays irradiated on a portion used for obtaining an x-ray image of the object to be examined;
>
> an x-ray diaphragm setting unit for variably setting the x-ray shielded portion to be shielded by the x-ray diaphragm unit;
>
> an x-ray flat panel detector opposed to the x-ray irradiation unit via the object to be examined and imaging x-rays passed through the object to be examined as an x-ray image;
>
> an image processing unit for subjecting the x-ray image obtained by the x-ray flat panel detector to an image processing; and
>
> a display unit displaying the x-ray image subjected to the image processing by the image processing unit, wherein
>
> the image processing unit comprises:
>
> a calculation unit reading out data of an x-ray detection element of the x-ray flat panel detector corresponding to the x-ray shielded portion shielded by the x-ray diaphragm unit which is variably set by the x-ray diaphragm setting unit and calculating a

line noise component from the read out data of the x-ray detection element; and

a line noise correction unit correcting a line noise of the x-ray image based on the line noise component calculated by the calculation unit.

The x-ray diagnostic imaging system of independent claim 1 includes an x-ray irradiation unit, an x-ray diaphragm unit, an x-ray diaphragm setting unit, an x-ray flat panel detector, an image processing unit, and a display unit. The x-ray diaphragm unit is disposed in a direction where the x-ray irradiation unit directs the x-rays to irradiate an object, and shields the irradiated x-rays except for a portion that is used to obtain the x-ray image of the object being examined. The x-ray diaphragm setting unit variably sets the x-ray shielded portion that is to be shielded by the x-ray diaphragm unit. The x-ray flat panel detector is positioned opposite to the x-ray irradiation unit and images x-rays that are passed through an object to be examined. The image processing unit processes the x-ray image obtained by the flat panel detector and provides the results to the display unit for displaying the x-ray image of the subject.

According to independent claim 1, the image processing unit includes a calculation unit that reads out data of the x-ray detection element in the x-ray flat panel detector corresponding to the x-ray shielded portion that is variably set by the x-ray diaphragm setting unit, and calculates a line noise component from the data read out of the x-ray detection element. Additionally, a line noise correction unit is provided to correct line noise of the x-ray image based on the line noise component calculated by the calculation unit. According to the diagnostic imaging system of independent claim 1, the x-ray diaphragm unit can include, for example, a first pair of shielding plates (3a, 3b) that move in a first direction (direction A), and a second pair

of shielding plates (3c, 3d) that move in a second direction (direction B). See Fig. 2 and corresponding text of the instant disclosure. According to this arrangement, it is possible to adjust the positions of the shielding plates, thereby variably setting the portion to be shielded by the x-ray diaphragm unit.

The Office Action alleges that Nagai teaches various features recited in independent claim 1. This does not appear to be the case. The Office Action alleges that Nagai discloses an x-ray diaphragm unit 22 and an x-ray diaphragm setting unit. Reference is directed to paragraph [0035]. Reference numeral 22, however, identifies a collimator used to collimate the irradiated x-rays, and improve image clarity. Further, the cited paragraph is completely silent on variably setting the collimator as alleged in the Office Action. Rather, Nagai discloses a supporting unit that supports both the x-ray generating unit and the x-ray detection unit. Nagai further provides a moving control unit capable of moving the entire assembly. See paragraph [0035]. The Office Action further alleges that Nagai provides an x-ray shielded portion that is shielded by the x-ray diaphragm unit in the form of invalid area 41. The invalid area, however, is different from the x-ray shielded portion of the instant invention. The invalid area provided in Nagai is used to restrain shading caused by stray signals, and not for correcting the line noise. Rather, Nagai provides a mask area 42 that is utilized to correct and/or reduce line noise. Further, the mask area of Nagai is fixed and cannot be variably set.

Regarding Ikeda, the Office Action also alleges that an x-ray diaphragm unit (6) and an x-ray diaphragm setting unit (6) are disclosed. Reference is directed to paragraph [0013]. At the outset, Applicants note that the Office Action purports to identify both the x-ray diaphragm unit and the x-ray diaphragm setting unit as the same element. Further, Applicants' review of the cited passage reveals that

reference numeral 6 identifies a collimator, and not a diaphragm unit that can be variably set. The collimator disclosed in Ikeda is fixed and cannot be adjusted in the manner previously described with respect to the claimed x-ray diaphragm unit. The cited references simply fail to provide any disclosure for features recited in independent claim 1 such as:

> ...
>
> an x-ray diaphragm unit disposed in a direction of x-ray irradiation of the x-ray irradiation unit and shielding the irradiated x-rays except for the x-rays irradiated on a portion used for obtaining an x-ray image of the object to be examined;
>
> an x-ray diaphragm setting unit for variably setting the x-ray shielded portion to be shielded by the x-ray diaphragm unit;
>
> ...
>
> ...
>
> a calculation unit reading out data of an x-ray detection element of the x-ray flat panel detector corresponding to the x-ray shielded portion shielded by the x-ray diaphragm unit which is variably set by the x-ray diaphragm setting unit and calculating a line noise component from the read out data of the x-ray detection element; and
>
> a line noise correction unit correcting a line noise of the x-ray image based on the line noise component calculated by the calculation unit.

It is therefore respectfully submitted that independent claim 1 is allowable over the art of record.

Claims 2-15 depend from independent claim 1, and are therefore believed allowable for at least the reasons set forth above with respect to independent claim 1. In addition, these claims each introduce novel elements that independently render them patentable over the art of record.

V. Rejections under 35 USC §103

Claims 5 and 11 were rejected under 35 USC §103(a) as being unpatentable over Nagai in view of Danielsson. Additionally, claims 4 and 10 were rejected under 35 USC §103(a) as being unpatentable over Nagai in view of Fivez.

As previously discussed, however, Nagai fails to provide any disclosure for numerous features recited in independent claim 1. Further, Nagai is completely silent on these features and, consequently, fails to provide any suggestion for such features. The inclusion of Danielsson and Fivez as secondary references to reject any of the pending claims does not remedy the failure by Nagai to disclose, or even suggest, the principal features that are recited in independent claim 1, from which claims 4, 5, 10, and 11 depend. Accordingly, the combination of Nagai with either secondary reference would necessarily fail to provide any disclosure or suggestion for all of the features recited in these claims.

It is therefore respectfully submitted that claims 4, 5, 10, and 11 are further allowable over the art of record.

VI. Conclusion

For the reasons stated above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, the issuance of a Notice of Allowance is believed in order, and courteously solicited.

If the Examiner believes that there are any matters which can be resolved by way of either a personal or telephone interview, the Examiner is invited to contact Applicants' undersigned attorney at the number indicated below.

Docket No. 529.45588X00
Serial No.10/558,361
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AUTHORIZATION

Applicants request any shortage or excess in fees in connection with the filing of this paper, including extension of time fees, and for which no other form of payment is offered, be charged or credited to Deposit Account No. 01-2135 (Case: 529.45588X00).

Respectfully submitted,
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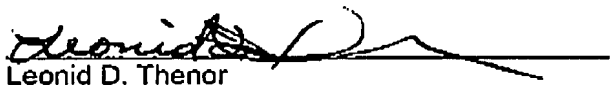

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